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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/002,178	12/31/1997	MARK T. BOHR	042390P4220	7527

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EXAMINER

GUERRERO, MARIA F

ART UNIT

PAPER NUMBER

2822

DATE MAILED: 11/29/2001

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Applicati n N .

09/002,178

Applicant(s)

BOHR, MARK T.

Examiner

Maria Guerrero

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 24 September 2001.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 31-54 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 31-54 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☐ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____.
- 4) ☐ Interview Summary (PTO-413) Paper No(s). _____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____.

DETAILED ACTION

1. This Office Action is in response to the Request for Continued Examination filed September 24, 2001.

Claims 1-30 are canceled.

Claims 31-54 are pending.

Continued Examination Under 37 CFR 1.114

2. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on September 24, 2001 has been entered.

Claim Rejections - 35 USC § 112

The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

3. Claims 31-54 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

The term "as thin as possible" in claim 31 is a relative term which renders the claim indefinite. The term "as thin as possible" is not defined by the claim, the specification does not provide a standard for ascertaining the requisite degree, and one

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of ordinary skill in the art would not be reasonably apprised of the scope of the invention. The claims do not define what thickness is possible or impossible to obtain.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

4. Claims 31-35, 37-54 are rejected under 35 U.S.C. 103(a) as being unpatentable over Efland et al. (U.S. 6,025,275) in view of Byrne (U.S. 5,136,364).

Regarding claims 31-54, Efland et al. discloses forming a dielectric layer 22 over a metal layer on a substrate, the metal layer including a bond pad and a metal member space apart from the bond pad by a gap (fig. 1A), the dielectric layer 22 may be composed of several layers of dielectric having different makeup, the dielectric layer 22 may be composed by several layers (oxide, nitride, or polyimides) (col. 3, lines 40-45, col. 5, lines 25-30).

Efland et al. also discloses forming an opening (fig. 1A). Efland et al. teaches forming a conducting barrier layer 30 over the dielectric layer, over sidewalls of the opening, and over the exposed top surface of the bond pad (fig. 1B, the formation of a continuous seal is inhered). Furthermore, Efland et al. shows an electroplating process to form a copper lead 50 (fig. 1C, col. 5, lines 30-40).

Efland et al. does not specifically show the formation of first, second, and third material. However, Efland et al. teaches the dielectric layer 22 may be composed by

several layers (oxide, nitride, or polyimides) (col. 3, lines 40-45, col. 5, lines 25-30). In addition, Byrne '364 shows the formation of the material to prevent moisture penetration (col. 2, lines 45-65).

Efland et al. fails to show forming the fourth material comprising an upper 4,000 Angstroms thick nickel vanadium film. However, this is known in the art as evidenced Byrne '364.

Byrne '364 discloses forming: a substrate 10, a bonding pad 11, a two component passivation layer, a first dielectric layer (silicon dioxide), a second dielectric layer (silicon nitride), a third dielectric layer can be a polyimide layer (fig. 3-5, col. 2, lines 60-65, col. 3, lines 1-35). Byrne '364 also teaches forming an opening to exposed the top surface of the bonding pad, depositing a barrier layer (fig. 3). Byrne '364 discloses typically bumps are connected to the bonds pads. Byrne '364 also discloses a barrier layer comprising a nickel-vanadium layer (col. 2, lines 40-43).. Furthermore, Byrne '364 discloses the formation of the bump as well known in the art (col. 1, lines 10-25).

Therefore, It would have been obvious to a person of ordinary skill in the art to modify Efland et al.'s process by including the information provided by Byrne. The modification would provide a seal for a semiconductor device, which will exclude contaminants from the critical parts (Byrne, col. 1, lines 48-51).

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5. Claim 36 is rejected under 35 U.S.C. 103(a) as being unpatentable over Efland et al. (U.S. 6,025,275) and Byrne (U.S. 5,136,364) as applied to claims 31-35, 37-54 above, and further in view of Lou (U.S. 5,759,906).

Regarding claim 36, Efland et al. fails to show the first material being doped with fluorine atoms. However, Lou teaches the use of fluorine-doped silicon oxide as well known as low dielectric material to reduce the capacitance between lines (col. 1, lines 60-67, col. 2, lines 5-10).

Therefore, it would have be obvious to a person of ordinary skill in the art to modify Efland et al.'s process by including the layer comprising fluorine atoms as taught Lou. The modification would provide an interconnection having reduced capacitance between lines.

Response to Arguments

6. Applicant's arguments filed September 24, 2001 have been fully considered but they are not persuasive. The Rejections are maintained.

In response to applicant's argument that the references fail to show certain features of applicant's invention, it is noted that the features upon which applicant relies (i.e., to obtain low capacitive coupling between the bond pad and the first member; the result is improved (faster) device performance) are not recited in the rejected claim(s). Although the claims are interpreted in light of the specification, limitations from the specification are not read into the claims. See *In re Van Geuns*, 988 F.2d 1181, 26 USPQ2d 1057 (Fed. Cir. 1993).

In response to applicant's argument that the examiner's conclusion of obviousness is based upon improper hindsight reasoning, it must be recognized that any judgment on obviousness is in a sense necessarily a reconstruction based upon hindsight reasoning. But so long as it takes into account only knowledge which was within the level of ordinary skill at the time the claimed invention was made, and does not include knowledge gleaned only from the applicant's disclosure, such a reconstruction is proper. See *In re McLaughlin*, 443 F.2d 1392, 170 USPQ 209 (CCPA 1971).

In response to applicant's argument that there is no suggestion to combine the references, the examiner recognizes that obviousness can only be established by combining or modifying the teachings of the prior art to produce the claimed invention where there is some teaching, suggestion, or motivation to do so found either in the references themselves or in the knowledge generally available to one of ordinary skill in the art. See *In re Fine*, 837 F.2d 1071, 5 USPQ2d 1596 (Fed. Cir. 1988) and *In re Jones*, 958 F.2d 347, 21 USPQ2d 1941 (Fed. Cir. 1992). In this case, the modification Efland et al. (U.S. 6,025,275) in view of Byrne (U.S. 5,136,364) would provide a seal for a semiconductor device, which will exclude contaminants from the critical parts (Byrne, col. 1, lines 48-51).

Conclusion

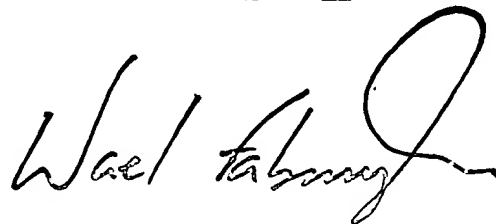
8. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Maria Guerrero whose telephone number is 703-305-0162.

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If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Carl Whitehead Jr. can be reached on 703-308-4940. The fax phone numbers for the organization where this application or proceeding is assigned are 703-308-7722 for regular communications and 703-308-7382 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703-308-0956.

MG
MG
November 19, 2001

A handwritten signature in black ink, appearing to read "Wael Fahmy". The signature is fluid and cursive, with a large loop at the end.

SUPERVISORY PRIMARY EXAMINER
TECHNOLOGY CENTER 2800